

In the early twentieth century, life insurance companies began promoting periodic surveillance of healthy adults based on the premise that apparently healthy adults harbor disease, that early-stage disease is detectable through comprehensive examination, and that detection leads to disease arrest, reversal, or cure. The truth of the first two premises is fairly easily demonstrated, but the third is more difficult to prove. Certainly, most practicing physicians can testify to the occasional dramatic detection of an asymptomatic abdominal mass or a small coin lesion seen on chest x-ray that resulted in the discovery and removal of an early-stage carcinoma. Such testimonials initially supported the growing enthusiasm for periodic examination of well adults, despite the lack of scientific proof of the benefit of such activities. Furthermore, success with immunization against common communicable diseases as well as public sanitation programs suggested that prevention was beneficial. Nevertheless, the transfer of this benefit to other major health problems, particularly problems or disease related to health habits and lifestyle, has yet to be demonstrated, especially when performed in the aggregate, as represented by the periodic health examination. One prospective, controlled study of annual examinations was unable to demonstrate lowered mortality, decreased outpatient clinic use or hospitalization rates in a comprehensively screened population as compared to a control group.

Despite this lack of demonstrable benefit, by the early 1970s a well-adult examination was one of the most common reasons for an office visit with a physician, and these yearly visits frequently resulted in the performance of laboratory tests and x-rays. These examinations have been largely focused on what may be called secondary prevention: the detection of asymptomatic disease in apparently healthy subjects. In addition to detecting disease, well-adult examinations have been thought to be beneficial by relieving the fears of those concerned about occult disease (i.e., reassurance of the "worried well"), by promoting the doctor-patient relationship, and by providing a "baseline" for future problem solving.

The Modern Era of Periodic Well-Adult Examinations

By the early 1970s, concern about the value of annual comprehensive physical examination of apparently well adults began to be expressed. This concern identified a number of problems with such examinations. One concern has to do with the lack of sensitivity of the annual examination to serious disease, despite the fairly frequent detection of deviations from normal, particularly in elderly individuals (e.g., bunions). A related problem has to do with the low prevalence of serious disease in asymptomatic populations and the consequent low predictive value of positive test results ordered for screening purposes (see Chapter 7). For ex-

ample, a positive stress electrocardiogram performed on an asymptomatic 35-year-old man (prevalence of significant coronary disease = 5%) is more likely to represent a false positive result than significant coronary artery disease. A third concern has to do with the risk, discomfort, and cost of such examinations, including the worry that such visits could actually increase patient anxiety (due to false positive results), cause inappropriate care seeking (by facilitating the patient's sick role), and decrease patients' self-care (by provision of false reassurance). Concerns about cost continue to be raised, including the cost of making adequate screening facilities available to all patients and providing follow-up of abnormal findings. Another concern is that such examinations may be applied to those who need it least: the burden of disease and risk factors is disproportionately present in lower socioeconomic populations, but these are not the groups who typically receive (or are encouraged to receive) periodic comprehensive examinations. A final concern has to do with the *focus* of such examinations. By emphasizing advancing knowledge of disease rather than improving health status, such examinations have been concentrated on secondary rather than primary prevention. Primary prevention involves the identification of risk factors or behaviors that could, if not reduced or reversed, adversely affect health in the future. Even when such behaviors are identified in periodic examinations, they typically have not been linked to behavior change efforts. This may be in part due to physician pessimism about motivating patients to achieve lasting behavior change.

In 1977, Breslow and Somers made a series of recommendations regarding the examination of well adults that took into consideration many of these concerns. They called for the inclusion of preventive "packages" incorporated into the day-to-day care of patients each having rational and varying periodicity (rather than annual), each package tailored to specific age and gender needs (rather than a single, vague "check-up"), and each selected based on scientific proof of efficacy, or at least prudent interpretation of available evidence. Finally, their recommendations included educational and counseling practices designed to influence health-related behaviors (e.g., seat-belt use, smoking habits).

The rationale for the package approach is based on the fact that prevention activities need to be highly focused on needs, partly because time is limited and partly because cost effectiveness is highly linked to prevalence. Consequently, prevention activities need to be based on epidemiologic data that identify frequent causes of death or serious morbidity. For adults age 18 to 65, such causes are communicable disease, motor vehicle accidents, coronary heart disease, stroke, and cancer (Table 224.1), along with their lifestyle concomitants, seat-belt usage, alcohol consumption, smoking habits, and dietary fat intake. Not only does the epidemiologic burden suggest that these are the conditions to be targeted, but a growing body of evidence attests to the benefit of primary and secondary prevention activities in

Table 224.1
Mortality Rates for Leading Causes of Death in the United States, 1981^a

Rank	Cause of death	Number of deaths	Percentage of total deaths
1	Heart diseases	753,788	38.1
2	Cancer	422,094	21.3
3	Cerebrovascular diseases	163,504	8.3
4	Accidents	100,704	5.1
5	Chronic obstructive lung disease	53,832	3.0
6	Pneumonia and influenza	50,725	2.6

^aStatistics from the American Cancer Society, 1985.

reducing morbidity and mortality. The Veterans Administration Cooperative Study (1972) and the more recent Hypertension Detection and Follow-up Program (1979) attest to the benefit of lowering diastolic blood pressure in the prevention of stroke and perhaps coronary artery disease. The Lipid Research Clinics trial (1984) and other studies have shown decreased mortality in high-risk men who achieve cholesterol lowering. Demonstration of the benefit of early detection and treatment of certain cancers has been more difficult. Sometimes demonstration of benefit is more apparent than real because of the problem of lead-time bias. Many cancer detection efforts may simply increase the time for which presence of cancer is known, and thereby appear to advance survival rather than make a real change in disease outcome (Figure 224.1). Nevertheless, studies are beginning to demonstrate the benefit of cancer detection efforts, particularly for cervical and breast carcinoma in women and possibly for skin and colorectal carcinomas in both sexes.

Current Recommendations

Several sets of recommendations have been issued that deal with the periodic examination of well adults. Each set of recommendations is slightly different (Figure 224.2), but all have attempted to base their recommendations on care-

ful scrutiny of available scientific evidence, and all have agreed that:

- The number of conditions sought or screened be limited
- Annual examinations be abandoned
- Age-, sex-, and risk-specific packages be developed

Persons in certain high-risk groups (e.g., pregnant women, IV drug users, family history of breast carcinoma) require different or more intensive types of screening. *All* recommendations apply only to asymptomatic individuals.

Communicable Disease

Whereas routine immunization has become an accepted obligation of pediatric practice, the same is not true of physicians caring for adults. A substantial portion of remaining morbidity and mortality from vaccine-preventable diseases occurs in older adults and adolescents. All adults should have primary immunization for tetanus and diphtheria, followed by continued booster doses (of adult toxoids) every 10 years. Young adults age 18 to 24 years should be immunized against measles and mumps if there is no history of previous infection or vaccination. For rubella, if there is no well-documented history of vaccination, immunity should be checked for by laboratory testing (clinical diagnosis is undependable); all susceptible young adults (18 to 24) and women of childbearing age should be vaccinated (pregnant women should *not* be vaccinated). Persons over 65 should receive influenza and pneumococcal vaccines, the former on an annual basis. Booster doses for the pneumococcal vaccine are not currently recommended. Adults should receive inactivated polio vaccine *only* if never previously immunized *and* traveling to endemic areas.

Accidents

Motor vehicle accidents are a major cause of morbidity and mortality in young adults, and the contributing roles of alcohol consumption and failure to use seat belts have been well documented. Unfortunately, the efficacy of physician counseling regarding these measures is not yet known, but most recommendations call for some counseling, particularly of adolescents and young adults regarding these practices. Prevention of unwanted pregnancy and sexually transmitted diseases could also be thought of as accidents worthy of prevention through counseling of young adults.

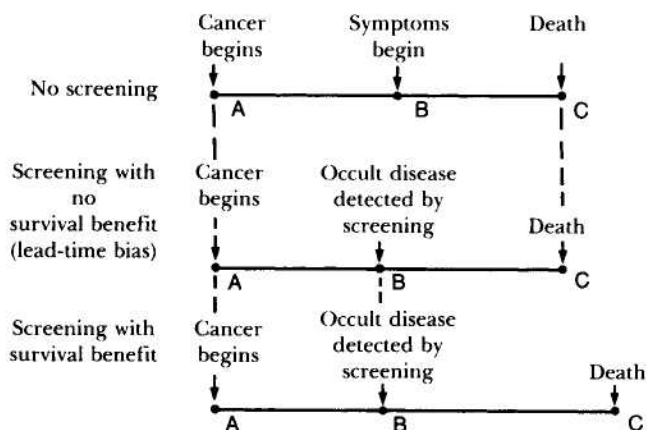


Figure 224.1
Lead-time bias in assessing the value of screening on cancer survival rates. A–C is the true survival time; B–C is the measured survival time encompassing the period of known disease.

Age		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
History & Physical																															
MD Breast Exam																															
Pelvic Exam																															
Rectal Exam																															
*Hearing Assessment																															
**Tetanus-Diphtheria Booster																															
**Influenza Immunization																															
Blood Pressure																															
***Pap Smear																															
Cholesterol																															
*VDRL																															
*PPD																															
Stool for Occult Blood																															
Sigmoidoscopy																															
Mammography																															

F	B & S
ACS	CTF

F Frame and Carlson
 B & S Breslow and Somers
 ACS American Cancer Society
 CTF Canadian Task Force on the Periodic Health Examination

Figure 224.2

Summary of recommendations of four major studies. A blackened square indicates that a study has considered the maneuver and recommended it. Squares left empty do not necessarily indicate that the study considered but did not recommend the maneuver.

*Canadian Task Force recommends that this be done on the basis of clinical judgment.

**At first visit, physician should check past immunization history per Centers for Disease Control recommendations for rubella, mumps, poliomyelitis, diphtheria/tetanus toxoids, pertussis.

***If sexually active.

Source: Medical Practice Committee. Periodic health examination: A guide for designing individualized preventive health care in the asymptomatic patient. *Annals of Internal Medicine* 1981;95:729-32. Reproduced by permission.

Cardiovascular Disease (including Stroke and Coronary Artery Disease)

Hypertension is prevalent, and itself a major risk factor for stroke and coronary artery disease, which are benefited by lowering elevated blood pressure, including mild elevations (90 to 100 mm Hg) if sustained. Blood pressure should be measured in all adults at least every 5 years, and some experts suggest it be measured in anyone over 25 on any visit to a physician.

Coronary artery disease and its sequelae—angina pectoris, myocardial infarction, and sudden cardiac death—have high annual death rates, but there is no evidence to

support early treatment in asymptomatic patients. Further, available screening tests (resting or stress ECGs) performed in such patients are severely limited due to the low prevalence problem. Consequently, prevention of coronary artery disease should be directed at identification of correctable risk factors (cigarette smoking, hypertension, hypercholesterolemia) rather than detection of occult disease. Cigarette smoking and hypercholesterolemia should be identified as early as possible. All adults should have blood cholesterol measured at an initial visit and every 5 years thereafter. Adults in moderate (75th to 90th percentile) and high-risk (above 90th percentile for age) categories should be treated by dietary intervention (Table 224.2). High-risk individuals

Table 224.2
Age-related Serum Cholesterol Values (mg/dl)

Age	Moderate risk (75th–90th percentile)	High risk (>90th percentile)
20–29	Over 200	Over 220
30–39	Over 220	Over 240
Over 40	Over 240	Over 260

may be of some benefit, but the costs are enormous. Currently, the only recommended procedure for lung cancer is in the area of primary prevention: the earliest possible detection of and intervention against cigarette smoking.

The situation for colorectal carcinoma is also complicated. It too is a common and lethal cancer with an overall 5-year survival of 45%, but 71% 5-year survival in Dukes A and B stages. Many studies attest to the ability of guaiac-impregnated slides (Hemoccult) to detect early-stage carcinomas, but whether mortality is lowered has yet to be demonstrated. More recent studies suggest that guaiac-impregnated slides may be insensitive to polyps (which can become cancerous), and perhaps as many as 25% of carcinomas. Consequently, if a mortality benefit is to be realized from screening, in all likelihood both guaiac slide testing and sigmoidoscopy will be necessary. The current recommendations from the Cancer Society are annual stool guaiac tests for adults over age 50, plus sigmoidoscopy every 3 to 5 years (after two negative examinations 1 year apart).

Breast cancer recommendations are dominated by two studies that demonstrated mortality lowering in women screened with annual breast examinations over age 40 coupled with periodic mammography (annually in one study, every 3 years in another). Concerns have been raised about the feasibility and cost of offering every woman in the United States a yearly mammogram over age 50 (and biannually from ages 40 to 49), although this appears to be the dominant recommendation in the United States at present.

Finally, the pap test has been shown epidemiologically to decrease the incidence and mortality of invasive cervical

carcinoma, and periodic testing is widely recommended, although there is variation in the interval recommended between examinations. Despite the widespread nature of cervical cancer screening recommendations, numerous women have either never had a Papanicolaou test or have not received it on a regular basis. Such screening ought to occur at least every 3 years (in normal-risk women) and continue indefinitely. The Cancer Society recommends that other cancers be screened for through a periodic cancer-related check-up, to include examination of the skin and oral cavity, neck, lymph node, digital rectal examination, and testicular (or ovarian) examination, performed annually over age 40, although no other group makes this recommendation.

What Is Actually Performed

Surveys of physicians' practices reveal that actual performance of recommended primary and secondary prevention procedures is surprisingly low (range 5 to 59%), given the frequency of well-adult visits. Disagreement with published recommendations is one reason cited, but even when physicians state agreement with screening recommendations, their performance is still low, particularly for items physicians must perform themselves (rather than order to be done by others). This suggests barriers to implementing the periodic health procedures recommended by the Canadian Task Force and others. Such barriers include lack of physician knowledge about recommended procedures, lack of skill (particularly in the counseling area), forgetfulness, lack of motivation due to conflicting recommendations, patient resistance, and lack of reimbursement. A major factor may well be boredom with repetitive activities that have low frequency of yielding abnormal results, as well as lack of time due to short office visits and other agendas. Successful implementation of components of the periodic health examination will likely require reminder systems, assistance by other staff, an organized system for patient education, and periodic assessment of physician performance.

Table 224.3
American Cancer Society Recommendations for Early Cancer Detection in Asymptomatic Persons

Cancer	Test	Age and frequency
Colorectal	Digital rectal examination	Yearly over 40
	Stool guaiac slide	Yearly over 50
	Sigmoidoscopy	Over 50 two annual exams, then every 3–5 years
Breast	Self-examination	Monthly over 20
	Physical examination	Age 20–40 every 3 years, yearly over 40
	Mammography	Baseline at 35–40, every 1–2 years 40–49, yearly over 50
Vulva, cervix, uterus, ovary	Pelvic examination	Every 3 years age 20–40, yearly over 40
	Pap smear	Over 30 two annual exams, then every 3 years
Other: Skin, thyroid, oral cavity, lymph nodes, testicles, prostate	Patient education and focused physical examination	Every 3 years 20–40, yearly over 40

Conclusion

A number of important questions with respect to the examination of well adults remain to be answered. Foremost among these are what to include and how to pay for and implement such activities on a wide scale. At present, a small number of activities and procedures, tailored to specific age, gender, and risk needs, have been identified. These activities should be periodically included in the *routine* care of adult patients. There should be emphasis on primary prevention, including the identification of risk factors and personal behaviors related to these risk factors, as well as organized office systems to ensure that such activities are actually carried out.

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